

CMASLab - Rules of conduct and safe behavior

Mutual respect and support, together with professional handling of devices, materials and products are prerequisites for successful research. All users of the laboratory are expected to behave accordingly and are obliged to operate in a safety- and environment-conscious manner. Sharing a workplace extends this responsibility and requests a higher degree of attention, respect and care. Our rules of conduct are designed to ensure a smooth and safe collaboration amongst all parties involved.

We, ETH and the CMASLab team, are doing our best to create a safe environment for your work. It is our responsibility to point out where potential hazards may occur and how you can protect yourself against them.

These guidelines shall help you to protect your own health and your environment. It is up to you to make sure you follow them but does not relieve you from awareness and the conscious use of tools, machines and materials. Not knowing a danger does not make you safe!

All instructions of your advisor and the lab responsible must be followed. Do not risk putting yourself and others in danger. The ETH SGU regulations must be respected. Disregarding the safety instructions will result in loss of access rights.

We are thankful for any input to improve our safety standard.

General code of conduct

Independent work in the laboratory is permitted only after participating at the general laboratory introduction and signing the terms and conditions. Regular working hours are weekdays from 07:00 until 19:00. Working beyond this timeframe is regulated in section '*Working alone*'. Working alone is not permitted if the type of work can lead to injuries that require immediate help from a second person.

1. The introduction to the general lab safety rules (this document) is carried out by the lab responsible. The training on machines and devices is carried out by the machine-responsible. Please feel free to ask them any question.
2. Work in the laboratory may be performed only in good physical and mental condition. Avoid operating machinery if fatigued. It is prohibited to work under the influence of drugs or alcohol.
3. Every user must keep the workplaces clean and tidy. Store all materials and tools that are not directly needed in the designated areas. If a device is out of order or the work place was not cleaned up by the previous user, immediately report (picture and/ or e-mail) to the lab- or the machine responsible.
4. Workplaces, materials and chemicals must be labeled with the user name, phone number, date and project. If a laboratory trolley or a general workspace is used for more than one day, it must be marked the same way. Label your personal compartments with your name and that of your advisor. Keep the doors of the cabinets closed. Please use removeable stickers – do not write with permanent markers directly on furniture.
5. When any device, machine or test setup is used for unattended over-night operations, the user must ensure that the process is operating as expected before leaving. If the setup is of medium- or high-risk level (see the definitions in

chapter 'Work alone'), a second competent person from the CMASLab must check the setting. The set up must be clearly labeled with an "overnight operation" sheet. The sheet must include the date, the name and phone number of the user. If applicable, add notes about the potential hazard (e.g. chemicals, temperature, pressure).

6. Visitors are allowed to access the laboratories only under the attendance of a lab employee. They should be announced to your advisor and the lab responsible. Some areas may be excluded from public access for reasons of security or confidentiality. Inside the lab, visitors must wear protecting glasses (available by advisor/lab responsible). No contact lenses are allowed.
7. Laboratories must be closed when leaving the room and locked overnight. For fire safety reasons, it is not allowed to fix the doors to keep them open. The windows of the room access doors must not be covered.
8. Operations that produce dust and chips (e.g. sanding, sawing...) must be performed in the post processing room CLA A15.2 or in the mechanical workshop in CLA D21.2.
9. Entering of liquids or dust in the centralized vacuum system must be avoided. Always use a vacuum-trap.
10. The storage and the use of silicone oils is restricted to the designated areas in D22.1.
11. Generation of smoke and large quantities of heat must be minimized (in particular, prevent releases of large quantities of hot air when operating the hot press, the autoclave or the ovens). The fire detectors are highly sensitive and may trigger a fire alarm. Pointless intervention of the fire brigade for a false alarm results in a high fee, charged to the originator.
If possible, perform the work during working days, from 8:00 until 17:00. In doubt, contact/inform the operational department (Betriebsabteilung / ISC) in advance.
12. After finishing your work, latest at the end of the workday, every user must ensure that all devices are turned off, all chemicals are safely stored and all valves and taps for gases and liquids are closed. All lights and the vacuum pumps shall be turned off. Except: Overnight running experiments (need to be labeled accordingly – ref. pt 3).
Before leaving, switch the lights off, close the windows and the doors. Leave the workspace clean and organized.
13. The utilization of machines subjected to mandatory introduction is managed through the online reservation calendar. Each use of the equipment must be entered in the outlook-calendar (a priori or a posteriori) for recording purposes.
14. Tools, devices and materials on marked workspaces or laboratory trolleys must not be used or removed without consent of the assignee. Return them after finishing your work; latest at the end of the day. Tools, devices and materials that are made available to all laboratory users must be returned the same day. All machines, tools, devices, equipment and workplaces must be cleaned and returned to their original storage area after completion of the work.
15. Immediately report the shortage of consumables and materials as well as defective equipment to your advisor, the lab responsible or the machine responsible.
16. Small machines and tools can be loaned from the ETH-library, also for private purposes. Details can be found on their home page. CMASLab equipment shall not leave the building.
17. All new procured equipment must be CE compliant. Related documents (manuals, declaration of conformity) must be filed on the server in .pdf format, with open access to all members of the group. Original manuals (printed) must be

stored close to the machine with unrestricted access to all users. Report missing manuals to your advisor or the lab responsible.

18. Freezer in CLA D32.2: Prepreg rolls must be stored in the provided shelves. The registration in the inventory list helps to keep the overview. Since the storage space is very limited, please check the inventory list before ordering new stuff and try to share materials whenever possible.
19. In case of observing maluse or disregarding of the above rules, the person's attention shall be drawn to the issue by the observer immediately. This accounts for anyone working in the laboratory.
20. Master- and Bachelor-students, as well as external co-workers, are responsible for their own insurance (liability and accidents) – refer to the document '*Merkblatt Versicherungen*' you received by the HR dept.
All ETH employed members (both, limited contractors as PhD & PostDoc and unlimited contractors as TAP) are insured against accidents by SUVA. ETH carries the risk on liability issues but may take regress. A personal liability insurance is strongly recommended.

General safety rules

When working with chemicals, appropriate Personal Protective Equipment (PPE) must be used. Labcoat and safety glasses are mandatory. The wear of correction glasses without side protection is only permitted for passing through the rooms and the affiliated offices. Wearing contact lenses is not allowed. Please use corrected glasses combined with some protecting over-glasses (OTG, available by your advisor or the lab responsible) or use corrected safety glasses.

The use of appropriate gloves is a must when working with chemicals. Details on that can be found in the corresponding MSDS. Before entering public spaces (e.g. Mensa, offices,...) or leaving the workspace for breaks, take them off and wash your hands. Wear closed shoes and cover your legs (e.g. long trousers or leggings), also in summer. Contact your advisor to provide you with any protective equipment.

For laundry, put the lab coats in the designated container (2-week-tour). Do not wash them at home. Dispose single use coats

1. Escape routes (marked with green signs) must be kept free at all times. The minimum width of the escape route is 1 meter. The EXIT signs must be visible at all times.
2. Familiarise yourself with the location of the next fire extinguisher. Read the handling instructions in a quiet moment – there is no time to do so in case of a fire. The SGU dept. offers fire-fighting courses (see Fire Safety Training on the ETH webpage).
3. Do not run in our rooms, corridors and on stairs. Always use the stair railings. Do not read any papers and do not use your mobile device when walking, particularly not on stairs.
4. The storage and consumption of food and drinks is prohibited in the laboratories. They have to be kept outside of the laboratory in the designated area at all time. Alcoholic beverages are not allowed in the laboratory space
The faucets in the labs shall be considered as non-drinking water. The tap may be contaminated and / or provide de-ionized water. Drinking anything from one of those taps can severely affect your health.
5. There are wardrobes for jackets, backpacks and equivalent. Those belongings shall not be stored on the floor (danger of stumbling).

6. Minimize emissions and do not use open flames. Works that generate sparks are restricted to the mechanical workshop CLA D21.2 only. If dust or noise is generated, respiratory and ear protection are mandatory. In designed areas, the wearing of steel cap shoes is mandatory. Contact your advisor to provide you with any protective equipment.
7. Gas cylinders can only be handled by authorized personnel. Do not manipulate them nor the connection pipes without permit from the responsible person.
8. Do not use chairs, trolleys, boxes or a fork-lift to climb and do not stand on tables, trolleys or desks. Use a ladder or a step to reach higher areas.
9. Do not use defective equipment, particularly electrical devices (e.g. extension cords). Do not try to repair them by yourself. Contact your advisor or the lab responsible.
Manipulation of electrical circuits exceeding the voltage limits of the Extra-Low Voltage band (50V AC, 120V DC; refer to DIN EN / IEC 61140 - replacing IEC 60449) is not permitted without a dedicated training.
10. New software on PC/NC machines (e.g. autoclave, press, testing machines etc.) must be tested during regular working hours.
11. The use of laser pointers is restricted to class 1 lasers only. Others (class 1M, 2M, 3R, 3B or 4) are forbidden to own and to use by law since June 1st, 2019. Class 2 lasers are exempt until June 1st, 2021. It is highly recommended to renounce the use of such devices in presentations completely.
Industrial lasers underlay separate restrictions. It is mandatory to follow the federal regulations.
12. The ETH emergency desk can be contacted 24/7:
Dial 888 from any internal phone or 044 342 11 88 from your mobile phone. Please store these numbers in your device.
Please note: There is no reliable connection to any mobile network on CLA A-floor. Use w-lan (eduroam5) & 'whatsapp'. Additional information regarding safety and recycling procedures are provided by the SGU-dept.
<https://www.ethz.ch/services/en/service/sicherheit-gesundheit-umwelt.html>

Handling of chemicals

Wearing a lab coat and safety glasses are mandatory in all lab rooms. When working with chemicals, appropriate Personal Protective Equipment (PPE) must be used additionally. Informations can be found in the Material Safety Data Sheet (MSDS) of the chemicals. The wear of corrected glasses without side protection is only permitted for passing through the rooms and the affiliated offices. Wearing contact lenses is not allowed in all lab rooms (ETH-rule). Please use corrected glasses combined with some protecting over-glasses (OTG, available by your advisor or the lab responsible) or use corrected safety glasses.

The use of appropriate gloves is a must when working with chemicals. Details on that can be found in the corresponding MSDS. Before entering public spaces (e.g. Mensa, offices,...) or leaving the workspace for breaks, take them off and wash your hands. Wear closed shoes and cover your legs (e.g. long trousers or leggings), also in summer. Contact your advisor to provide you with any protective equipment.

For laundry, put the lab coats in the designated container (2-week-tour). Do not wash them at home. Dispose single use coats.

1. The handling of chemicals needs to be instructed by your advisor. Do not play around with materials you do not know. Do not touch chemicals of any kind (also resins, lubricants, paints, release agents, solvents...) before having understood the material safety data sheets (MSDS). Before handling, you must know potential dangers (e.g. reactions, prerequisites for PPE, etc.) and how the material needs to be disposed. Whenever possible do not handle chemicals in an open container outside a fume hood or properly ventilated area. In the event of uncertainty, contact your advisor or the lab responsible for assistance. Do not eat and drink when working with chemicals. Do not store any food in the chemical lab. The faucets in the labs shall be considered as non-drinking

water. The tap may be contaminated and / or provides de-ionized water. Drinking from one of those taps can affect your health severely.

2. Label all containers of your experiments with content, owner's name and date. In case of highly toxic or reactive chemicals, label and store your experiment accordingly.
3. The fume hoods must be closed and the light switched off when no one is working there. This ensures proper working of the ventilation system. If you're considering a bad or even non-working ventilation, please report to your advisor or the lab responsible to get it fixed.
4. The use of the eye-wash devices shall be trained. In a quiet moment, flush your eyes for a few minutes to get familiar with this kind of situation and the equipment.
5. Chemicals must be stored in the dedicated chemical cabinets. Whenever possible, leave them in their original container. Close the container tight immediately after withdrawal. Residues of chemicals must not be poured back. Clean up spilled materials immediately. Collect the absorbent material in a closeable container, label it and dispose as chemical waste appropriately. Do not dispose towels or absorbent, soaked with highly flammable solvents in the general waste bin. The vapors concentrate there and may self-ignite. Slightly contaminated towels may be disposed in the designated area under the fume hoods.
6. Used chemicals must be collected in the corresponding chemical waste container. Halogenated compounds are collected separately, also materials containing nano-particles. Put information on the waste container about the materials you put in (solvents, resins, amines...). Report full (or nearly full) chemical waste containers to get them disposed by your advisor or the lab responsible. Empty containers can be found on top of the chemical storage cabinets.
7. Containers for highly flammable solvents larger than 5 liters need to be electrically conductive and must be grounded before pouring. Non-conductive cans may generate electrostatic charge. Uncontrolled discharge may ignite the vapors.
8. Take notice of people wearing enhanced protective equipment (e.g. temp. resistant gloves, face shields, masks, etc.). Stay in respectful distance to them; their work may be dangerous for you too. Keep an eye on them and be aware about the first aid that could be appropriate in case of an emergency.
9. If you recognize any kind of irregularities, report them immediately. Do not hesitate to ask about the normal status.
10. It is strongly forbidden to store any chemicals in food recipients, and vice versa. Also do not store chemicals in refrigerators dedicated to food, and vice versa. Fridges for chemicals are labeled accordingly.
11. It is prohibited to spill any chemicals and solvents (e.g. acetone, isopropanol ...) into the sink/sewer system.
12. Excessive reacting resin must be placed in a temperature resistant container inside a fume hood until the end of the reaction and the complete cool down. Direct covering with a small quantity of cold water reduces the generation of smoke and speeds up the cooling. This water then needs to be disposed as chemical waste - do not drain it in the sink.
13. After finishing, stow all materials, clean up your workplace and wash your hands diligently with soap and water before leaving the lab.

Machine safety

1. Check your w-lan connection before you start working at CLA A-floor. There is no mobile network available. Communication is only possible by fix line phones or by w-lan (eduroam5 / 'whats-app'). In case of an emergency call the help line: Dial 888 from any fix line phone or **044 342 11 88** from your mobile device. Both numbers lead to the ETH emergency desk and are available 24/7. Store these numbers in your mobile phone.
2. The use of the stationary machines in CLA D21.2 and CLA A15.2 is restricted to accordingly trained people (need signed confirmations). The use of workbenches, hand tools and the suction table are allowed after an introduction.
3. When machining FRP, wearing a labcoat, safety glasses, respiratory and ear protection is mandatory. Wear tight long clothes with long sleeves. Close your coat and tie your hair together to prevent them getting caught by a rotating machine. The use of headphones is not permitted. They do not protect sufficiently against noise. You need full concentration on your work.
4. The use of cut-resistant gloves is instructed during the particular machine training. Thin elastic gloves are recommended to protect your skin against abrasive saw-dust.
5. Safety and protection devices on machines and equipment must not be removed or bypassed, except for research purposes and in case of maintenance. Following preconditions must be respected:
 - The responsible for the machine/equipment must have approved the modification;
 - The usage of the machine/equipment by other users must be prevented;
 - After completion, the safety and protection devices must be restored to their original state.
6. Concerning the air filtration system installed in CLA A15.2:
 - The system is exclusively designed to operate with plastics, composites and wood dust and chips.
 - No metal chips, solvents or paints must be admitted into the filtration system. Sparks may invoke dust explosions.
 - Machining of metal parts is restricted to the room CLA D21.2.
7. After finishing, stow all machines and equipment and clean up the workplaces. Switch off the ventilation and the light when leaving the room. Wash your hands carefully with soap and water. Use some re-greasing hand cream. Large volumes of waste can be disposed directly in the huge press-container on CLA C-floor.

Working alone

Working alone is forbidden if the type of work can lead to an injury that requires immediate help from a second person.

Work days (Monday – Friday) during office hours (7:00-19:00):

	Cat I: Professors, scientific assistants, postdocs, PhD students, technical and laboratory staff	Cat II: Master students, semester thesis students, master program teaching assistants	Cat III: Bachelor students, bachelor program teaching assistants, interns and trainees
<p>High risk level:</p> <p>Machines without safety devices/with disabled safety devices, open flames, hazardous chemicals, processes above 300°C, work above head level on a raised platform/ladder, manipulation of electrical circuits not belonging to the extra-low-voltage class,... The list is not exhaustive.</p>	<p>Requires a second, qualified person belonging to Cat. I or Cat. II within vocal or visual range</p>		
<p>Medium risk level:</p> <p>Dynamic machines, handling of gas tanks, LCM/RTM processes, milling machines, lathes, winding machines, circular saws, autoclave, forklifts, presses, material tests with intermediate energy release (tensile/compressive tests of CFRP),... The list is not exhaustive.</p>	<p>Working alone is permitted if the user is within reach of a functioning communication device (e.g. mobile phone) or organizes control calls with a second, qualified person.</p>		<p>Requires a second, qualified person belonging to Cat. I or Cat. II within vocal or visual range.</p>
<p>Low risk level:</p> <p>Hand lamination, usage of vacuum, drilling, samples polishing, manipulation and measuring of extra-low-voltage circuits, material tests with low energy release, thermal analysis equipment, electric tools, measuring instruments,... The list is not exhaustive.</p>	<p>Working alone is permitted if the user is experienced and familiar with the work.</p>		

Working alone

Work outside office hours, on weekends & public holidays:

	Cat. I: Professors, scientific assistants, postdocs, PhD students, technical and laboratory staff	Cat. II: Master students, semester thesis students, master program teaching assistants	Cat. III: Bachelor students, bachelor program teaching assistants, interns and trainees
<p>High risk level:</p> <p>Machines without safety devices/with disabled safety devices, open flames, hazardous chemicals, processes above 300°C, work above head level on a raised platform/ladder, manipulation of electrical circuits not belonging to the extra-low-voltage class,...</p> <p>The list is not exhaustive.</p>	Requires a second, qualified person belonging to Cat. I or Cat. II within vocal or visual range	Requires a second, qualified person belonging to Cat. I within vocal or visual range	
<p>Medium risk level:</p> <p>Dynamic machines, handling of gas tanks, LCM/RTM processes, milling machines, lathes, winding machines, circular saws, autoclave, forklifts, presses, material tests with intermediate energy release (tensile/compressive tests of CFRP),...</p> <p>The list is not exhaustive.</p>	Working alone is permitted if the user is experienced and familiar with the work. The user needs to be within reach of a functioning communication device (e.g. mobile phone) or organizes control calls with a second, qualified person.		Requires a second, qualified person belonging to Cat. I or Cat. II within vocal or visual range.
<p>Low risk level:</p> <p>Hand lamination, usage of vacuum, drilling, samples polishing, manipulation and measuring of extra-low-voltage circuits, material tests with low energy release, thermal analysis equipment, electric tools, measuring instruments,...</p> <p>The list is not exhaustive.</p>	Working alone is permitted if the user is experienced and familiar with the work.	Working alone is permitted if the user is experienced and familiar with the work. The user needs to be within reach of a functioning communication device (e.g. mobile phone) or organizes control calls with a second, qualified person.	Requires a second, qualified person within vocal or visual range.

Open issues:

- Get DIN EN / IEC 61140 (replaces DIN EN / IEC 60449)
- Chemical symbols chart (actual version)

Summary (could be hung up around the labs to remind students)

1. Safety first!

Personal (lab coat & glasses, gloves) & surrounding (label, communicate)

2. Put back your stuff

3. Leave the place in a way in which you would like to find it

4. In doubt NEVER hesitate to ask again

14. If large quantities of flammable solvents (acetone, isopropanol ...) are spilled, immediately cover with inert binder, switch off all heat sources, warn other people in the direct environment, open the window, leave the room and close the doors. Do NOT switch off the lights. This could generate a spark inside the interrupter that may ignite the vapors. Get some help from the emergency desk. Dial 888 from any fix line phone - from a mobile, dial: 044 342 11 88